

### **Patent Claims**

1. High-pressure coupling device for directing media through quick-change systems, for example such as oil, water, gas, fats and similar media, whereby the high-pressure coupling device (20) comprises a coupling device bottom part (21) and a coupling device top part (22), characterized by the fact that the coupling bottom part (21) is provided with a firmly anchored, rigid valve screw (32) which creates the sealing effect for delivering the medium along with a spring-loaded gate valve socket (34) while the top coupling part (22) is provided with a spring-loaded valve disk (46) that creates the sealing effect for the side of the coupling device (20), which is to be supplied with high-pressure medium, together with a rigid valve body (43) such that a rigid valve element (32, 43) actuates the spring-loaded valve element (46, 34) of the opposite part in the high-pressure coupling device (20) in a valve-actuating manner when the bottom coupling part and the top coupling part are joined.
2. High pressure coupling device in accordance with Claim 1, characterized by the fact that the valve arrangement between the coupling bottom part (21) and the coupling top part (22) is synchronous and positively controlled.
3. High pressure coupling device in accordance with Claim 1 or 2, characterized by the fact that the positive control of the valve arrangement sees to it that the spring-loaded valve parts (34, 46) are actuated in such a way from the respective opposite part of the valve (32, 43) that they do not begin oscillating as a result of the medium flow passing through.
4. High pressure coupling device in accordance with one of Claims 1 through 3, characterized by the fact that the medium flow keeps the movable parts (34, 46) of the high-pressure coupling device (20) in check, without moving them against a spring load.

5. High pressure coupling device in accordance with one of Claims 1 through 4, characterized by the fact that the valve screw (32) in the valve bottom part (21) with an associated threaded bolt (61) is screwed into an associated tapped hole in the coupling device bottom part (21) and thus forms a stationary and constant abutment for the medium flow permeating the high pressure coupling device (20)
6. High pressure coupling device in accordance with one of Claims 1 through 5, characterized by the fact that the gate valve socket (34) in the valve bottom part (21) is initially tensioned in the direction toward its off position with a relatively weakly mounted valve spring (35), whereby this spring (35) only has to overcome the friction of the gasket (29) at the inner area of the pipe body (24), in order to place the gate valve socket (34) in its off position.
7. High pressure coupling device in accordance with one of Claims 1 through 6, characterized by the fact that in the region of the ring extension (28) of the gate valve socket (34) a transverse ventilation hole (36) is present.
8. High pressure coupling device in accordance with one of Claims 1 through 7, characterized by the fact that the gate valve socket (34) is sealed via a long sealing path, once in the region of its ring extension (28) directed radially outward and secondly in its radially offset cylindrical region, in which the gasket (29) is arranged.
9. High pressure coupling device in accordance with one of Claims 1 through 8, characterized by the fact that the coupling device top part (22) consists essentially of a valve flange (37a) which is fixed in an associated recess (38) to the underside of the workpiece pallet (15) by means of screws (39), so that an excellent centering of the coupling device top part (22) in this recess (38) is achieved

10. High pressure coupling device in accordance with one of Claims 1 through 9, characterized by the fact that the spring-loaded valve body (43) in the coupling device top part (22) can be optionally blocked or released, as a result of which the high-pressure coupling device (20) can be operated either positively controlled or non-positively controlled.

11. High pressure coupling device in accordance with one of Claims 1 through 10, characterized by the fact that the coupling device bottom part (21) is fastened with clamp screws (13), whereby these clamp screws (13) are screwed in directly through the cover (2) into a machine table (1).

12. High pressure coupling device in accordance with one of Claims 1 through 11, characterized by the fact that the screw (13) is connected with a clamping shoe (14), which positively engages in the associated pipe body (24) of the coupling device bottom part (21) and with it clamps the coupling device bottom part on the machine table (1).

13. High pressure coupling device in accordance with one of Claims 1 through 12, characterized by the fact that two clamp screws (13) with eccentrically rotating clamping shoes (14) hold the pipe body (24)

14. High pressure coupling device in accordance with one of Claims 1 through 13, characterized by the fact that a further clamp screw (13) exhibits a circular disk (17), which also engages in an associated groove on the periphery of the pipe body (24) of the coupling device bottom part (21).

15. High pressure coupling device in accordance with one of Claims 1 through 14, characterized by the fact that the clamping shoe 14 can be freely rotated by means of a corresponding screw and with it can be disengaged from its engaged position with the associated groove in the pipe body (24) and vice versa.

16. High pressure coupling device in accordance with one of Claims 1 through 15, characterized by the fact that the entire coupling device bottom part (21) is installed in a recess (19) in the machine table (1) that is countersunk and open to the top, so that the pipe body (24) belonging to the coupling device bottom part (21) fits positively in this recess (19) with the corresponding stop edges and is protected from corresponding deformation.

17. High pressure coupling device in accordance with one of Claims 1 through 16, characterized by the fact that a corresponding radial clearance to the associated peripheral surfaces in the recess in the cover (2) exists, so that no transmission of load takes place there between the pipe body (24) of the coupling device bottom part (21) to the cover (2).

18. High pressure coupling device in accordance with one of Claims 1 through 17, characterized by the fact that a thermal expansion clearance is guaranteed for the pipe body (24) in the region of the recess in the cover (2).

19. High pressure coupling device in accordance with one of Claims 1 through 18, characterized by the fact that the gap (76) between the coupling device bottom part (21) and the recess in the cover (2) of the rapid-action clamping cylinder (4) thus prevents an undesirable heat transfer to this cover (2) and with it also an undesirable deformation work on the rapid-action clamping cylinder (4), which otherwise could become distorted and cause inaccurate machining on the workpieces clamped on the workpiece pallet (15).

20. High pressure coupling device in accordance with one of Claims 1 through 19, characterized by the fact that the gap (76) is cooled with blast air in order to prevent a thermal expansion of the coupling device bottom part (21).

21. High pressure coupling device in accordance with one of Claims 1 through 20, characterized by the fact that the front of the valve body (43) in the coupling device top part (22) protruding from the recess (38) bears a gasket (44) on its front with which it rests upon the associated sealing body (34) on the coupling device bottom part (21) in a sealing manner.

22. High pressure coupling device in accordance with one of Claims 1 through 21, characterized by the fact that the valve body (43) can be moved in the valve flange (37).

23. High pressure coupling device in accordance with one of Claims 1 through 22, characterized by the fact that by means of a valve block (52) the path of displacement of the valve body (43) can be blocked, so that said valve body is continuously held in its extended position.

24. High pressure coupling device in accordance with one of Claims 1 through 23, characterized by the fact that to achieve a blocking of the valve a cross hole is arranged in the valve flange (37), in which a pinion (55) is pivoted, which exhibits an actuating opening (56) for engagement of a wrench.

25. High pressure coupling device in accordance with one of Claims 1 through 24, characterized by the fact that the pinion (55) combs with a rack (54) which can be moved in the region of a transverse slot (57) in the valve flange (37).

26. High pressure coupling device in accordance with one of Claims 1 through 25, characterized by the fact that in the rotary actuation of the pinion (55) the rack (54) is moved axially in the direction of the arrow (69), or in its opposite direction, as a result of which the end (58) of the rack either engages or disengages with the front of the valve body (43).

27. High pressure coupling device in accordance with one of Claims 1 through 26, characterized by the fact that in the engage position of the end (58) of the rack (54) the valve body (43) is blocked in its front displacement position and can no longer be moved against the force of the spring.
28. High pressure coupling device in accordance with one of Claims 1 through 27, characterized by the fact that the pinion (55) bears gaskets at its two opposing ends in order to prevent an escape of the pressure medium from this region.
29. High pressure coupling device in accordance with one of Claims 1 through 28, characterized by the fact that when the valve block (52) is disengaged, the valve body (42) can spring back and there is no risk of damage when the workpiece pallet (15) with the coupling device top part (22) is placed on a smooth surface on the machine table (1).
30. High pressure coupling device in accordance with one of Claims 1 through 29, characterized by the fact that when the valve block (52) is engaged then the ring extension (78) of the valve body (43) extends out of the recess of the valve flange (37) and hangs over this area, so that in the case of high load change impacts caused by corresponding impacts in the medium flow the valve body (43) can no longer lift with its gasket (44) at the opposite surface in the coupling bottom part (21), as a result of which a positive locking is guaranteed, which works without spring force and therefore cannot vibrate and result in self-destructions.
31. High pressure coupling device in accordance with one of Claims 1 through 30, characterized by the fact that in the coupling device top part (22) in the transition region between the tappet (50) and the bolt of larger diameter a vertical stop edge (74) is constructed, so that an absolute straight line guide of the entire valve body (46, 50) in the associated

bore hole (49) is given; as a result preventing the valve body from jamming or hammering when high pressure change impacts take place in the central recess (68).

32. High pressure coupling device in accordance with one of Claims 1 through 31, characterized by the fact that the valve screw (32) screwed in the coupling device bottom part (21) has a centering shoulder (60), with which the valve screw in the machine table (15) can be centered.

33. High pressure coupling device in accordance with one of Claims 1 through 32, characterized by the fact that the high-pressure coupling device (20) in the machine table (1) is arranged outside of the central recess (3) for the rapid-action clamping cylinder (4), and in particular does not exhibit any load-transferring connection whatsoever to the cover (2) of the rapid-action clamping cylinder (4).